

**ADDENDUM NO. 1**  
**TO THE**  
**DRAWINGS AND SPECIFICATIONS**  
**FOR THE**  
**2014 PAVEMENT MARKING**  
**PW2014-100**

**ISSUED FROM:** CITY HALL AT THE SHOWERS BUILDING  
Post Office Box 100  
401 North Morton Street  
Bloomington, Indiana 47404

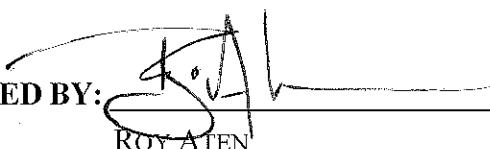
**ISSUE DATE:** July 28, 2014

**Bid DATE:** July 29, 2014

This Addendum No.1 to the drawings and specifications shall supplement, amend and become a part of the bidding documents, plans, and specifications. All bids and construction contracts shall be based on these modifications to the original contract documents.

Item No. 1: Line item #7 of the 2014 pavement markings ~ alternate #1, Greenways unit price sheet, which reads as followed;  
*"PAVEMENT MESSAGE MARKINGS, PREFORMED PLASTIC, SHARROW"*,  
Shall be stricken and replaced with the following;  
*"PAVEMENT MESSAGE MARKINGS, PREFORMED THERMOPLASTIC, SHARROW"*.

Item No. 2: Replace the following special condition;  
*"Pavement message markings applied within a designated bike lane shall be preformed plastic in accordance with INDOT 808.02"*  
with;  
*"Pavement message markings applied within a designated bike lane shall be preformed thermoplastic pavement markings as detailed in the attached specification"*.

	<p style="text-align: center;">   <b>CERTIFIED BY:</b>  <b>ROY ATEN</b>  <b>SENIOR PROJECT MANAGER</b>  <b>CITY OF BLOOMINGTON, IN</b> </p>
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**Acknowledge receipt of the addendum by submitting a signed copy with your bid proposal.**

**RECEIVED BY:            CONTRACTOR (FIRM AND ADDRESS)**

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**SIGNATURE:** 

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**DATE:** 

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**PRINTED NAME:** 

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**TITLE:** 

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**SPECIFICATION**  
**PREFORMED THERMOPLASTIC PAVEMENT MARKINGS**

1. **USE:** A durable, high skid resistant, retroreflective pavement marking material suitable for use as interstate shields, route shields, bike path, roadway, intersection, airport, commercial or private pavement delineation and markings.
  - 1.1. The markings must be a resilient white, yellow or other color thermoplastic product, the surface of which must contain glass beads and abrasives in an alternating pattern. The markings must be resistant to the detrimental effects of motor fuels, lubricants, hydraulic fluids etc. Lines, legends and symbols are capable of being affixed to bituminous and/or Portland cement concrete pavements by the use of the normal heat of a propane torch.
  - 1.2. The markings must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastic when heated with the torch.
  - 1.3. The markings shall not have minimum ambient and road temperature requirements for application, storage, or handling.
2. **MANUFACTURING CONTROL AND ISO CERTIFICATION:** The manufacturer must be ISO 9001:2008 certified and provide proof of current certification. The scope of the certification shall include manufacture of reflective highway markings.
3. **MATERIAL:** Must be composed of an ester modified rosin resistant to degradation by motor fuels, lubricants etc. in conjunction with aggregates, pigments, binders, abrasives, and glass beads which have been factory produced as a finished product, and meets the requirements of the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways. The thermoplastic material conforms to AASHTO designation M249-79 (98), with the exception of the relevant differences due to the material being supplied in a preformed state.
  - 3.1. Graded Glass Beads:
    - 3.1.1. The material must contain a minimum of thirty percent (30%) intermixed graded glass beads by weight. The intermixed beads shall be clear and transparent. Not more than twenty percent (20%) consists of irregular fused spheroids, or silica. The index of refraction shall not be less than 1.50.
    - 3.1.2. The material must have factory applied coated surface beads and abrasives in addition to the intermixed beads at a rate of 1/2 lb. ( $\pm 20\%$ ) per 11 sq. ft. The surface beads and abrasives must be applied in an alternating arrangement across the surface of the material so that the surface is covered in what is best described as a "checkerboard" pattern of glass beads and abrasive materials. The abrasive material must have a minimum hardness of 7 (Mohs scale). These factory applied coated surface beads shall have the following specifications:
      - 1) Minimum 80% rounds
      - 2) Minimum refractive index of 1.5
      - 3) Minimum  $\text{SiO}_2$  Content of 70%;
      - 4) Maximum iron content of 0.1%;

Size Gradation		Retained, %	Passing, %
US Mesh	Um		
12	1700	0 - 2%	98 - 100%
14	1400	0 - 6%	94 - 100%
16	1180	1 - 21%	79 - 99%
18	1000	28 - 62%	38 - 72%
20	850	62 - 71%	29 - 38%
30	600	67 - 77%	23 - 33%
50	300	86 - 95%	5 - 14%
80	200	97-100%	0 - 3%

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3.2. Pigments:

3.2.1. White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.

3.2.2. Red, Blue, and Yellow: The material shall be manufactured with sufficient pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected. The yellow pigments must be organic and must be heavy-metal free.

3.2.3. Other Colors: The pigments must be heavy-metal free.

3.3. Heating indicators: The top surface of the material (same side as the factory applied surface beads) shall have regularly spaced indents. These indents shall act as a visual cue during application that the material has reached a molten state so satisfactory adhesion and proper bead embedment has been achieved and a post-application visual cue that the installation procedures have been followed.

3.4. Skid Resistance: The surface of the preformed retroreflective marking materials, wherein every other shaped portion contains glass beads, or abrasives with a minimum hardness of 7 (Mohs scale), shall upon application provide a minimum skid resistance value of 60 BPN when tested according to ASTM: E 303.

3.5. Thickness: The material must be supplied at a minimum thickness of 90 mils (2.29 mm) or 125 mils (3.15 mm).

3.6. Retroreflectivity: The preformed retroreflective marking materials upon application shall exhibit adequate and uniform nighttime retroreflectivity. The marking materials shall have the following retroreflectivity as measured using a Delta LTL 2000 or LTL-X Retroreflectometer:

White preformed reflective marking materials—minimum of  $275 \text{ mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$

Note: Initial retroreflection and skid resistance are affected by the amount of heat applied during installation. When ambient temperatures are such that greater amounts of heat are required for proper installation, initial retroreflection and skid resistance levels may be affected.

3.7. Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.

3.8. Abrasives: The abrasives and surface beads must be applied in an alternating arrangement across the surface of the material so that the surface is covered in what is best described as a “checkerboard” pattern of glass beads and abrasive materials. The abrasive material must have a minimum hardness of 7 (Mohs scale).

4. **APPLICATION:**

4.1. Asphalt: The materials shall be applied using the propane torch method recommended by the manufacturer. The material must be able to be applied without minimum requirements for ambient and road temperatures and without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer. The pavement shall be clean, dry and free of debris. Supplier must enclose application instructions with each box/package.

4.2. Portland Concrete: The same application procedure shall be used as described under Section 4.1. However, a compatible primer sealer may be applied before application to assure proper adhesion.

5. **PACKAGING:** The preformed thermoplastic markings shall be placed in protective plastic film with cardboard stiffeners where necessary to prevent damage in transit. Linear material must be cut to a maximum of 3' long pieces. Legends and symbols must also be supplied in flat pieces. The cartons in which packed shall be non-returnable and shall not exceed 40" in length and 25" in width, and be labeled for ease of identification. The weight of the individual carton must not exceed seventy (70) pounds. A protective film around the box must be applied in order to protect the material from rain or premature aging.

6. **TECHNICAL SERVICES:** The successful bidder shall provide technical services as required.

7. **PERFORMANCE:** The preformed thermoplastic markings shall meet state specifications and be approved for use by the appropriate state agency.



## APPLICATION INSTRUCTIONS

### PreMark® Preformed Thermoplastic Pavement Markings

*First-time applicators should contact Flint Trading, Inc. for product support and on-site training.*

**For enhanced skid/slip resistance, Flint Trading, Inc. recommends using PreMark® with ViziGrip® in areas with pedestrian/cyclist traffic such as crosswalks, bike paths, and parking facilities.**

### SURFACE APPLICATION, GENERAL REQUIREMENTS:

- Equipment:**
- Flint 2000EX™, or equivalent propane fueled torch with pressure regulator and 25 ft. of hose
  - Gas Powered Blower or Broom
  - Utility Knife, Putty Knife
  - Paint roller (for sealer applications only)
  - Tape Measure
  - Adequate Supply of Propane
  - Water sprayer (optional)
  - Chalk Sticks and Chalk Snap Line
  - Hammer and Chisel
- Moisture:** Pavement must be dry prior to positioning the PreMark® material.
- Surface:** Surface must be free of dirt, dust, deicing agents, chemicals and significant oily substances. PreMark® can be applied on asphalt, portland cement concrete (in conjunction with PreMark® sealer), and new, or old thermoplastic. Portland cement concrete must be free of all curing compounds. When applying on old thermoplastic scrape off any loose material and remove the oxidized (powdery) layer by grinding the surface, or heating the surface and scraping off the oxidized layer to expose fresh material. **Do not apply on top of paint or cold plastic.**
- Material:** Keep PreMark® dry at all times. Avoid extreme storage temperatures. PreMark® should be stored indoors at temperatures between 35° F. and 90° F. Packages should be stored flat and stacked a maximum of 25 high. PreMark® should be handled with care in temperatures below 50° F, as it will be less flexible in colder weather. Shelf life is 12 months. PreMark® sealer should be used for applications on non-bituminous pavements.
- Temperature:** PreMark® does not have any road or ambient temperature requirements.

### SAFETY PRECAUTIONS:

Protective clothing, consisting of leather boots, or work shoes, long pants, gloves, and either safety goggles or a face shield, and a safety vest should be worn while applying PreMark®. Avoid all contact with the molten PreMark® material and Flint 2000 EX® heat torch flame. If you do get molten material on your skin, flush the area immediately with plenty of water and then seek medical attention. Do not attempt to pull the molten material off of your skin. In the event of accidental skin contact with the sealer wash contaminated skin with soap and water and remove contaminated clothes immediately. In the event of accidental sealer contact with the eyes, immediately flush eyes with plenty of water for at least 15 minutes; remove contact lenses; call a physician.

### INSTRUCTIONS FOR APPLICATION ON ASPHALT:

1. Clean intended application area thoroughly. All loose particles, sand, dust, etc. must be removed. Utilize a power blower or compressed air if available, otherwise sweep completely.
2. Ensure that no moisture is present prior to positioning the PreMark® material on the pavement surface. Surface moisture is not often visible so you should assume that some moisture is present. Remove moisture by drying the application area with a propane fueled torch such as the Flint 2000 EX.
3. Position all connecting parts of the PreMark® (lines, legends, or symbols) on to the pavement surface with the **exposed beaded side up**. There should be no gaps between the adjoining segments. You may overlap the edges slightly. Check to ensure that proper layout and alignment is obtained before heating the material.
4. Prepare to heat the PreMark® by positioning yourself with the wind at your back as you face the marking. This will allow the wind to move the heat over the unheated portion of the material while at the same time keeping the heat away from your feet. Regularly spaced indents have been manufactured into the top surface of the PreMark® material. The closing of these indents will provide a visual cue during application that the material has reached a molten state and proper bead embedment has been achieved. The PreMark® material must be heated to its melting temperature to achieve a bond with the pavement. **Insufficient heat will result in inadequate bonding and failure.**

5. Heat the PreMark® by moving the flame from your torch in a sweeping motion, approximately 2 feet wide. Heat slowly, but steadily keeping the nozzle of the torch about 4 to 8 inches above the material. **Caution: Maintain a minimum distance of 4 inches between the torch nozzle and the material. Any closer will cause superficial scorching of the material without adequate melting throughout.** Continue to heat the PreMark® until the indents close. At this point stop the heating process. Overheating the material will sink the top coating of beads into the PreMark® material and the resulting marking will be less retroreflective initially. **Note: The organic pigment in yellow PreMark® is susceptible to a superficial color change if exposed to excessive heat.** Very intense heat applied to yellow PreMark® will yield a deep orange color. This color change affects the topmost layer of material only. Normal traffic wear will expose the underlying yellow color.
6. Inspect the recently applied PreMark® to ensure that complete bonding has occurred over the entire area. After the PreMark® has cooled to near ambient temperature, cut an area in the interior of the material with a chisel where it appears the material has received the least amount of heat. For white PreMark® this will appear the whitest in color. If the material can be lifted without evidence of asphalt on the underside, insufficient heat has been applied. Simply reapply heat until adequate bonding has occurred. **Note: Do not leave the project until a sufficient bond has been established.** Attempts to reheat at a later date will be unsuccessful.
7. PreMark® is formulated with surface applied and intermixed glass beads to provide both high initial retroreflectivity and better visibility throughout its service life. PreMark® can be supplied without pre-applied surface beads. When this happens beads must be applied to the surface during application while the material is in the molten state to provide adequate initial retroreflectivity. This is also a very important step in obtaining the required skid resistance.
8. PreMark® will cool and set rapidly within a couple of minutes of application. If desired, setting time can be accelerated with a spray of cool water.

#### INSTRUCTIONS FOR APPLICATION ON NON-BITUMINOUS SURFACES:

1. Follow steps 1 and 2 as stated for application on asphalt. **Note: Worn, polished concrete should be ground or milled so the surface becomes rough.**
2. Delineate the area to receive the PreMark® using a chalk line, chalk or crayon. Once the marking has been traced, or the area delineated, remove the marking from the pavement.
3. Apply sealer approved for use with PreMark® to areas outlined in chalk or crayon. Allow it to dry until it will not transfer to the finger when touched. The more porous the surface, the more sealer is required. **Caution: Do not attempt to speed up the drying process by using an open flame as the sealer is flammable at this stage.** Remember: It is important to cover the entire area with sealer where the PreMark® will be applied.
4. Continue with Steps 3 through 6 as stated above under "Instruction for Application on Asphalt" until application is complete. **Note: When trying to lift the recently applied PreMark® material (step 6) off of the non-bituminous surface it is unlikely that any part of the pavement will be lifted up (with the PreMark®). Adequate bonding has occurred if the PreMark® separates and part of the PreMark® remains stuck to the pavement.**

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#### NOTES:

- Closed indents act as a post-application visual cue that the application procedures have been followed.
- PreMark® is compatible with asphalt and concrete surfaces and can be applied on special surfaces, i.e., bricks and cobble stones, using an approved sealer.
- Do not allow 2 pieces of PreMark® to remain in direct contact with each other, as they will bond together especially in hot weather. Use the plastic separation sheets to avoid this situation.
- You can "cut and paste" with PreMark®. Use a knife to score the material and carefully break it along the score. In warm weather you can use scissors. Don't throw or drop PreMark® in lower temperatures, as it will be less flexible in colder weather.
- Oil impervious PreMark® can be applied immediately after completion of daily paving operations.
- Dispose of all materials in accordance with all applicable federal, state and local laws and regulations.

PreMark® has a patented visible indent system, US Pat 5,861,206

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